Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH102	BS	Statistics, Probability and Calculus	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce fundamental concepts of statistics and probability.

COURSE ALIGNMENT WITH UNSDG:

"The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education).**"

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Collect and classify primary and secondary data for statistical analysis.
CO2 Calculate and interpret measures of central tendency and dispersion.
CO3 Apply Bayes' Theorem and probability distributions to solve real-world problems.
CO4 Evaluate mathematical expectations, moments, and moment-generating functions.
CO5 Solve problems involving integration and differentiation, including multiple integrals.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1 Quiz
ATL2 Activity Based Learning
ATL3 Midterm Exams
ATL4 Flip Class
ATL5 Seminar Presentation
ATL6 Assignments
ATL7 Poster
ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH102	BS	Statistics, Probability and Calculus	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

Basic Mathematics

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Introduction to Statistics:** Definition and objectives of Statistics. Applications in Science. Collection of Data: Internal/External, Primary/Secondary. Population, Sample, and Representative Sample	9	ATL1 ATL3
II	**Descriptive Statistics:** Classification and Tabulation of Univariate Data. Graphical Representation and Frequency Curves. Measures of Central Tendency and Dispersion. Bivariate Data Summarization.	9	ATL1 ATL3 ATL6
III	**Probability Theory:** Experiments, Sample Space, and Events. Combinational and Conditional Probability. Bayes Theorem. Discrete & Continuous Distributions (Binomial, Poisson, Geometric, Normal, Chi-Square, T, F).	9	ATL1 ATL3 ATL6 ATL8
IV	**Expected Values & Moments:** Mathematical Expectation and its Properties. Variance and Moments. Interpretation of results. Moment Generating Functions.	9	ATL1 ATL3
V	**Calculus:** Basic Concepts of Differential and Integral Calculus. Application of Double and Triple Integrals in engineering contexts.	9	ATL1 ATL3 ATL8
	TOTAL	45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

MIT OpenCourseWare, "MIT RES.6-012 Introduction to Probability, Spring 2018," YouTube playlist. (Apr. 24, 2018). [Online]. Available:

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH102	BS	Statistics, Probability and Calculus	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

https://www.youtube.com/playlist?list=PLUl4u3cNGP60hI9ATjSFgLZpbNJ7myAg6.

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. S. M. Ross, *Introduction to Probability Models*. New York, NY, USA: Academic Press.
2. A. M. Goon, M. Gupta, and B. Dasgupta, *Fundamentals of Statistics*, Vols. I & II. Kolkata, India: World Press.

REFERENCE BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44th ed. New Delhi, India: Khanna Publishers, 2017.
2. S. M. Ross, A First Course in Probability, 10th ed. Upper Saddle River, NJ, USA: Prentice Hall, 2018.
3. I. R. Miller, J. E. Freund, and R. Johnson, Probability and Statistics for Engineers, 4th ed. New Delhi, India: PHI Learning, 2010.
4. A. M. Mood, F. A. Graybill, and D. C. Boes, Introduction to the Theory of Statistics, 3rd ed. New York, NY, USA: McGraw-Hill Education, 1974.
5. P. V. O'Neil, Advanced Engineering Mathematics, 7th ed. Stamford, CT, USA: Thomson Learning, 2011.
6. M. D. Greenberg, Advanced Engineering Mathematics, 2nd ed. Upper Saddle River, NJ, USA: Pearson Education, 1998.
7. P. N. Wartikar and J. N. Wartikar, Applied Mathematics, vols. I & II. Pune, India: Vidyarthi Prakashan, 1992.

Suggested e- resources (Websites/e- books)

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma139

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH102	BS	Statistics, Probability and Calculus	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	-	3	2	-	-	1	-	-	-	2	1	3	-
CO2	3	3	1	2	2	-	-	-	-	-	-	2	1	3	-
CO3	3	3	3	2	-	1	-	-	-	-	-	2	2	3	2
CO4	3	3	2	-	-	-	-	-	-	-	-	1	1	3	-
CO5	3	3	2	2	-	-	-	-	-	-	-	2	2	2	-

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability:

1. To understand the basics of computers including hardware, software, how data is stored, and how operating systems manage daily tasks.
2. To learn step-by-step problem solving using simple blocks of computational thinking, flowcharts, and basic algorithms.
3. To get a friendly introduction to AI, Cyber security and Ethics.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Apply computational thinking frameworks and algorithmic design techniques to formulate structured solutions for engineering problems.

CO2 Analyze fundamental AI paradigms, network architectures, and information security threats to determine appropriate use cases and defensive mechanisms.

CO3 Evaluate digital ethics frameworks, algorithmic biases, and data privacy regulations to propose responsible technology implementations.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1 Quiz

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL7 Poster
ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

PREREQUISITES:

None

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Foundations of Computational Thinking & Logic** Computational Thinking Framework: decomposition, pattern recognition, abstraction, algorithmic design. Engineering Problem-Solving methodologies. Logical Control Structures: sequence, selection, iteration. Error Classification: syntax vs. logical errors. Systematic Debugging strategies	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
II	**Algorithmic Design & Problem Representation** Diagrammatic Problem Solving with flowchart symbols, Structural Flowcharting for linear, conditional, and repetitive scenarios. Pseudo-code conventions and structured representation. Logic Translation: Flowcharts to pseudocode. Algorithmic Evaluation: correctness and efficiency	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination))
III	**Artificial Intelligence Paradigms** Historical Foundations, Core Concepts, Machine Learning Paradigms: Supervised and Unsupervised Learning. Introduction to Data Science and applications. Key AI Domains: Natural Language Processing (NLP), Computer Vision, Machine Translation and Indian Knowledge Systems (IKS).	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
IV	**Cybersecurity, Information Security** Computer Networks: LAN, WAN, Network Interconnecting Devices. Cybersecurity Threats: Viruses, Worms, Trojan Horses, Malware. Defensive Mechanisms: Firewalls, Antivirus Software,	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	Secure Password Practices, Safe Browsing Protocols.		Examination)
V	**Digital Ethics** Data Pipeline, Algorithmic Fairness, Accountability, Data Privacy, Prevention of Algorithmic Bias. Generative AI and Intellectual Property: Copyright & Ownership, Hallucinations & Misinformation	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
	Total Hours	**45**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:
https://www.youtube.com/watch?v=S-7LrggTfA8&list=PLZ2ps__7DhBYSzaAFqpyQKqmoni-EefS7 (IIT Madras)

B. Remedial classes for slow learners:
As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. V. Rajaraman, *Fundamentals of Computers*, 6th ed. New Delhi, India: PHI Learning, 2014.
2. R. Thareja, *Computer Fundamentals and Programming in C*, 2nd ed. Oxford, UK: Oxford University Press, 2016

Reference Books

1. M. Bishop, *Computer Security: Art and Science*, 2nd ed., Boston, MA: Addison-Wesley, 2019.
2. S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed., Upper Saddle River, NJ: Pearson, 2021.
3. J. Wing, *Computational Thinking*, Cambridge, MA: MIT Press, 2017.
4. P. Denning and M. Tedre, Computational Thinking, Cambridge, MA: MIT Press, 2019.
5. D. Leslie, *Ethics of Artificial Intelligence: A Framework for Fairness, Transparency, and Accountability*, London: Alan Turing Institute, 2020.

Suggested e- resources (Websites/e- books)

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

1. Ethics of AI Bias https://www.youtube.com/watch?v=NgaW_p7gsRc [MIT OCW]
2. https://teachablemachine.withgoogle.com/

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	1	1		2							1	3	1	
CO 2	2	1			2	1						1	1	3	2
CO 3					1	3	1	3		1		2	1	2	1

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Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To understand the basic model of a modern computer with its various processing units.
2. To impart knowledge on CPU and it's processing of programs.
3. To provide the information for hardware utilization methodology.
4. To impart knowledge of Multiprocessor and inter-process communication.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Understand the architecture of a modern computer.

CO2 Explain the functional behavior of CPU and its other processing units.

CO3 Knowledge of the Peripherals of a Computer System.

CO4 Give the information to speed-up the working of Computer System.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1 Quiz

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL9 Industrial Visit Report

PREREQUISITES:

Knowledge of Computer System Organization (BTCS103M)

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Computer Basics:** Von Newman model, CPU, Memory, I/O, Bus, Memory registers, Program Counter, Accumulator, Instruction register, Micro-operations, Register Transfer Language, Instruction cycle, Instruction formats and addressing modes.	9	ATL1 ATL3 ATL4 ATL8
II	**Control Unit Organization:** Hardwired control unit, Micro-programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming. **Arithmetic and Logic Unit**: Arithmetic Processor, Addition, subtraction, multiplication, and division, Floating point, and decimal arithmetic.	9	ATL1 ATL3 ATL4 ATL8
III	**Input Output Organization:** Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor, Data transferring approaches and modes.	9	ATL1 ATL3 ATL4 ATL8
IV	**Memory organization:** Memory Hierarchy, Cache Memory - Organization and types of cache mappings, Virtual memory, Memory Management Hardware.	9	ATL1 ATL3 ATL4 ATL8
V	**Multiprocessors:** Pipeline and Vector processing, Instruction and arithmetic	9	ATL1 ATL3

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B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	pipelines, Vector and array processors, Interconnection structure and inter-processor communication.		ATL4 ATL8
		Total	**45**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.youtube.com/watch?v=4TzMyXmzL8M

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. M. Morris Mano, Computer System Architecture, Fourth edition, Pearson Education, 2015.
2. William Stallings, Computer Organization and Architecture, Seventh Edition, PHI, 2009.

REFERENCES:

1. A. S. Tanenbaum, Structured Computer Organization, 6th ed. Boston, MA, USA: Pearson Education, 2016.
2. J. P. Hayes, Computer Architecture and Organization, 3rd ed. New Delhi, India: McGraw-Hill, 2017.
3. J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, 4th ed. San Francisco, CA, USA: Morgan Kaufmann / Elsevier, 2007.
4. R. S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th ed. New Delhi, India: Penram International Publishing / Prentice Hall, 2015.
5. N. Carter, Computer Architecture (Schaum's Outlines), 3rd ed. New Delhi, India: Tata McGraw-Hill, 2012.
6. C. Hamacher, Z. Vranesic, and S. Zaky, Computer Organization, 5th ed. New Delhi, India: Tata McGraw-Hill, 2002.

Suggested e- resources (Websites/e- books)

1. https://inst.eecs.berkeley.edu/~cs152/sp26/152_policies/
2. https://ocw.mit.edu/courses/6-823-computer-system-architecture-fall/

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B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

LIST OF PRACTICAL

S.No.	Title	Co Mapping
1.	Study of peripherals, components of a Computer System.	CO3
2.	Write a C program for sum of two binary numbers.	CO2
3.	Write a C program for multiplication of two binary numbers.	CO2
4.	Write a C program to implement Booth's algorithm for multiplication.	CO2
5.	Write a C program to implement Restoring Division Algorithm.	CO2
6.	Write the working of 8085 simulator GNUsim8085 and basic architecture of 8085 along with small introduction.	CO1
7.	Study the complete instruction set of 8085 and write the instructions in the instruction set of 8085 along with examples.	CO1
8.	Write an assembly language code in GNUsim8085 to implement data transfer instruction.	CO1
9.	Write an assembly language code in GNUsim8085 to store numbers in reverse order in memory location.	CO1
10.	Write an assembly language code in GNUsim8085 to add two 8 bit numbers stored in memory and also storing the carry.	CO1,CO2

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	-	-	-	-	-	-	2	2	1	1
CO2	3	3	2	-	1	-	-	-	-	-	-	2	3	2	2
CO3	3	2	2	2	-	-	-	-	-	-	-	1	2	-	1
CO4	3	3	3	2	2	-	-	-	-	-	-	3	3	3	2

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Identify situations where computational methods and computers would be useful.
2. Given a computational problem, identify and abstract the programming task involved.
3. Approach the programming tasks using techniques learned and write pseudo-code.
4. Choose the right data representation formats based on the requirements of the problem.
5. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand
6. Write the program on a computer, edit, compile, debug, correct, recompile and run it.
7. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Understand the basic terminologies used in computer programming.

CO2 Proficient in using the basic constructs of C, to develop a computer program.

CO3 Understand the use of functions, pointers, arrays and files in programming.

CO4 Understand the fundamentals of procedure-oriented programming and be able to apply it in computer program development.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1 Quiz

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

PREREQUISITES:

None

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Introduction to Programming Languages:** Evolution of Programming Languages, Structured Programming, The Compilation Process, Object Code, Source Code, Executable Code, Operating Systems, Interpreters, Linkers, Loaders, Fundamentals Of Algorithms, Flowcharts.	6	ATL1 ATL4 ATL8
II	**Introduction to 'C' Language**: Character Set. Variables and Identifiers, Built-In Data Types. Variable Definition, Arithmetic Operators and Expressions, Constants And Literals, Simple Assignment Statement, Basic Input/ Output Statement, Decision Making Within A Program, Conditions, Relational Operators, Logical Connectives, If Statement, If-Else Statement, Loops: While Loop, Do While, For Loop. Nested Loops, Switch Statement.	6	ATL1 ATL4 ATL8
III	**Arrays and Pointers:** Array Manipulation; Searching, Insertion, Deletion of an Element from an one dimensional Array; Finding the Largest/Smallest Element in an Array; Two Dimensional Arrays, Addition/Multiplication of Two Matrices, Transpose of a Square Matrix, Address Operators, Pointer Type Declaration, Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Pointer Arrays.	6	ATL1 ATL4 ATL8
IV	**Functions:** Modular Programming and Functions, Prototype of a Function: Parameter List, Return Type, Function Call, Block Structure, Call by Reference, Call by Value, Recursive Functions and Arrays as Function Arguments.	6	ATL1 ATL4 ATL8

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

V	**Structure:** Structure Variables, Initialization, Structure Assignment, Structures and Arrays: Arrays of Structures.	6	ATL1 ATL4 ATL8
	Total Hours	**30**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.youtube.com/watch?v=48S8Bsh4V2w

B. Assignments & Coding Problems:

MIT OCW 6.S096 Problem Sets

C. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. B. S. Gottfried, Programming with C, 2nd ed. New Delhi, India: Tata McGraw-Hill, 2006.
2. Head First C: A Brain-Friendly Guide

REFERENCE BOOKS:

1. A. B. Tucker, Programming Languages, 2nd ed. New Delhi, India: Tata McGraw-Hill, 1986.
2. T. W. Pratt and M. V. Zelkowitz, Programming Languages: Design and Implementation, 4th ed. New Delhi, India: Prentice Hall of India, 2001.
3. H. Schildt, C: The Complete Reference, 4th ed. New Delhi, India: Tata McGraw-Hill, 2000.
4. Y. Kanetkar, Let Us C, 16th ed. New Delhi, India: BPB Publications, 2018.
5. R. Bangia, Fundamentals of Programming Languages, 1st ed. New Delhi, India: Cyber Tech Publications, 2007.
6. G. Perry and D. Miller, C Programming Absolute Beginner's Guide, 3rd ed. Indianapolis, IN, USA: Que Publishing, 2013.

Suggested e- resources (Websites/e- books)

1. https://ocw.mit.edu/courses/6-s096-introduction-to-c-and-c-january-iap-2013/

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

2. https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/

LIST OF PRACTICALS		
S.No.	**Title**	**Co Mapping**
1.	Write a C program to display “This is my first C Program.	CO1
2.	Write a C program to calculate area and circumference of a circle.	CO2
3.	Write a C program to perform addition, subtraction, division and multiplication of two numbers.	CO2
4.	Write a program to calculate simple and compound interest.	CO2
5.	Write a program to swap values of two variables with and without using third variable.	CO2
6.	Write a program to display the size of every data type using “size of” operator	CO1
7.	Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.	CO2
8.	Write a program to input two numbers and display the maximum number.	CO2
9.	Write a program to find the largest of three numbers using ternary operators.	CO2
10.	Write a program to find the roots of quadratic equation.	CO2
11.	Write a program to input name, marks of 5 subjects of a student and display the name of the student.	CO2
12.	Write a Program to Check Whether a Number is Prime or not.	CO2
13.	Write a program to find the largest and smallest among three entered numbers and also display whether the Identified largest/smallest number is even or odd.	CO2
14.	Write a program to find the factorial of a number.	CO2
15.	Write a program to check number is Armstrong or not.(Hint: A number is Armstrong if the sum of cubes of individual digits of a number is equal to the number itself).	CO2
16.	Write a program to check whether a number is Palindrome or not	CO2
17.	Write a program to generate Fibonacci series.	CO2
18.	Write a program to find GCD (greatest common divisor or HCF) and LCM (least common multiple) of two numbers.	CO2
19.	Write a Program to Search an element in array.	CO3
20.	Write a Program to perform addition of all elements in Array.	CO3
21.	Write a Program to find the largest and smallest element in Array.	CO3

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B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

22.	Write a Program for deletion of an element from the specified location from Array.	CO3
23.	Write a Program to access an element in 2-D Array.	CO3
24.	Write a program for addition of two matrices of any order in C.	CO3
25.	Write a Program to multiply two 3 X 3 Matrices.	CO3
26.	Write a program to add, subtract, multiply and divide two integers using user-defined type function with Return type.	CO3
27.	Write a program to generate Fibonacci series using recursive function.	CO3
28.	Write a program to find the sum of all the elements of an array using pointers.	CO3
29.	Write a program to swap value of two variables using pointer.	CO3
30.	Write a program to add two numbers using pointers.	CO3
31.	Write a program to input and print array elements using pointer.	CO3
32.	Write a program to create a structure named company which has name, address, phone and Of Employee as member variables. Read name of company, its address, phone and non-employee. Finally display this member's value.	CO4
33.	Write a program to read Roll No, Name, Address, Age & average-marks of 12 students in the BCT class and display the details from function.	CO4
34.	Write a program to add two distances in feet and inches using structure.	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	1	-	-	-	-	-	-	2	2	1	-
CO2	3	3	2	2	3	-	-	-	-	-	-	2	3	2	1
CO3	3	3	3	2	3	-	-	-	-	-	-	2	3	2	2
CO4	3	3	3	2	2	-	-	-	-	-	-	3	3	2	1

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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (CSE-Generative AI-IBM) (in association with IBM)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM108N	DCC	Problem Solving with Programming	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To gain foundational knowledge of software development concepts, programming paradigms, and essential tools used in modern software engineering
2. To develop strong programming fundamentals by learning variables, data types, control structures, functions, and basic algorithms through hands-on coding practice..
3. To understand and apply the principles of object-oriented programming (OOP), including classes, objects, inheritance, polymorphism, and encapsulation.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education).**

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Explain the fundamentals of software development, programming paradigms, and the software development lifecycle, including essential tools and environments..

CO2 Apply core programming concepts such as variables, data types, operators, control structures, loops, functions, and basic algorithms to develop simple software programs.

CO3 Develop object-oriented solutions by designing and implementing classes and objects, applying concepts like inheritance, polymorphism, and encapsulation

CO4 Demonstrate good software development practices including code documentation, version control, testing techniques, clean coding principles, and basic project collaboration tools.

CO5 Implement structured programs using file handling, strings, pointers (if applicable), and user-defined functions while applying debugging and testing techniques.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (CSE-Generative AI-IBM) (in association with IBM)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM108N	DCC	Problem Solving with Programming	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL1 Quiz
ATL2 Activity Based Learning
ATL3 Midterm Exams
ATL4 Flip Class
ATL5 Seminar Presentation
ATL6 Assignments
ATL7 Poster
ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Skills, Basic Programming Concepts, Data Handling Concepts, Spreadsheet Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Introduction to Software Development:** Get introduced to the world of software development and gain an understanding of the software development lifecycle. Explore different programming paradigms and learn about essential tools and technologies used in software development.	6	ATL2 ATL3 ATL4 ATL8
II	**Programming Fundamentals:** Dive into the core concepts of programming and learn the fundamentals of writing code. Explore variables, data types, control structures, functions, and basic algorithms. Develop your problem solving skills through hands-on coding exercises	6	ATL2 ATL3 ATL4 ATL8
III	**Introduction to Object-Oriented Programming:** Explore the principles of object-oriented programming (OOPs) and learn how to design and implement classes and objects. Understand concepts like inheritance, polymorphism, and encapsulation. Develop object-oriented programs through handson coding projects.	8	ATL2 ATL3 ATL4 ATL8

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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (CSE-Generative AI-IBM) (in association with IBM)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM108N	DCC	Problem Solving with Programming	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

IV	**Introduction to Data Structures and Algorithms:** Introduce yourself to common data structures and algorithms used in software development. Learn about arrays, linked lists, stacks, queues, and basic sorting and searching algorithms. Analyze the efficiency and performance of algorithms.	6	ATL2 ATL6
V	**Software Development Practices:** Learn about software development best practices, including code documentation, version control, and testing. Understand the importance of clean coding practices and code refactoring. Gain insights into collaborative development and project management tools.	6	ATL2 ATL3 ATL4 ATL8
	Total Hours	**30**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.python.org/

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

1. Gottfried BS – *Programming with C*, TMH publications.
2. Robert Lafore; *Object oriented programming in C++* ; Fourth edition ; Pearson publication;2002

REFERENCE BOOKS:

1. Yashwant Kanetkar, "*Let us C*", BPB Publication, 16th Edition 2018.
2. E Balagurusamy; *Object oriented programming with C++;* Seven edition; TMH; 2017.

LIST OF PRACTICAL

S.No.	Title	CO Mapping
1.	Installation and configuration of the programming environment (IDE/Compiler), introduction to software development tools, and execution of a simple "Hello World"	CO1

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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (CSE-Generative AI-IBM) (in association with IBM)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM108N	DCC	Problem Solving with Programming	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	program.	
2.	Write programs using variables, data types, input/output statements, operators, and expressions.	CO1
3.	Develop programs using decision-making statements (`if`, `if-else`, `switch`) and iterative statements (`for`, `while`, `do-while`).	CO2
4.	Implement programs using functions, recursion, parameter passing, and user-defined functions.	CO2
5.	Design and implement programs using arrays (1D and 2D) and basic string operations.	CO2, CO5
6.	Implement object-oriented concepts by creating classes and objects with constructors and member functions.	CO5
7.	Develop programs demonstrating inheritance (single, multilevel, hierarchical) and method overriding.	CO3
8.	Implement polymorphism using function overloading, operator overloading (if applicable), and virtual functions.	CO3
9.	Develop programs implementing basic data structures such as arrays, stacks, queues, and linked lists.	CO3
10.	Implement searching (Linear and Binary Search) and sorting (Bubble, Selection, Insertion) algorithms and analyze their performance.	CO2, CO3
11	Develop programs for file handling (create, read, write, append, and update files).	CO2
12	Perform debugging, exception/error handling (if applicable), unit testing, and code documentation using coding standards.	CO5
13	Use a version control system (Git) to create a repository, commit changes, manage branches, and collaborate on a simple project.	CO4, CO5
14	Mini Project: Develop a menu-driven application integrating programming fundamentals, object-oriented concepts, file handling, and data structures while following software development best practices.	CO4

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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (CSE-Generative AI-IBM) (in association with IBM)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM108N	DCC	Problem Solving with Programming	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2	1	3	–	–	1	1	1	–	2	3	1	–
CO2	3	3	3	2	3	–	–	–	1	1	–	2	3	2	–
CO3	2	3	3	2	3	–	–	1	1	1	–	2	3	2	1
CO4	2	2	2	3	3	1	–	3	3	2	2	3	3	1	1
CO5	2	3	3	3	3	1	–	2	2	2	1	3	3	2	1

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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B. Tech (CSE/IT): All Programs

SEMESTER-I/II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS102M	BEC	Introduction to Design Thinking	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. The objective of this course is to provide the new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products which useful for a student in preparing for an engineering career.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education).**

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Define Design Thinking and identify its role in innovation.
CO2 Conduct user research to empathize with stakeholders and define core problems.
CO3 Generate creative ideas through various ideation techniques.
CO4 Develop low-fidelity prototypes and iterate based on user feedback.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1 Quiz
ATL2 Activity Based Learning
ATL3 Midterm Exams
ATL4 Flip Class
ATL5 Seminar Presentation
ATL6 Assignments
ATL7 Poster
ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

B. Tech (CSE/IT): All Programs

SEMESTER-I/II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS102M	BEC	Introduction to Design Thinking	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		15	9				

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

None.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Introduction to Design Thinking:** Definition, History, Mindset of a Design Thinker (Empathy, Optimism, Iteration), Design Thinking vs. Analytical Thinking.	9	ATL1 ATL3 ATL6 ATL8
II	**Empathize Phase**: User-centric research, Observation techniques, Interviewing for empathy, Immersion, Empathy Maps, Persona development.	9	ATL1 ATL3 ATL6 ATL8
III	**Define Phase**: Analysis and Synthesis of research, Point of View (POV) statements, "How Might We" (HMW) questions, Identifying user needs and insights.	9	ATL1 ATL3 ATL6 ATL8
IV	**Ideate Phase**: Rules of Ideation, Brainstorming, Mind Mapping, SCAMPER, Storyboarding, Selecting and prioritizing ideas.	9	ATL1 ATL3 ATL6 ATL8
V	**Prototype & Test**: Types of Prototyping (Paper, Digital, Physical), Low-fidelity vs. High-fidelity, Feedback loops, Iterative testing, Final Presentation.	9	ATL1 ATL3 ATL6 ATL8
	Total Hours	**45**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
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BTCS102M	BEC	Introduction to Design Thinking	Max	60	20	20	30	20	2	0	2	3
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Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

https://www.youtube.com/watch?v=_r0VX-aU_T8

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

1. Developing Thinking Skills (The Way to Success)

REFERENCE:

1. E. Balagurusamy, Developing Thinking Skills (The Way to Success), 1st ed. New Delhi, India: Khanna Publishing House, 2022.

Suggested e- resources (Websites/e- books)

1. NPTEL - Design Thinking: A Primer
2. CircuitVerse - Interactive Logic Simulator

LIST OF PRACTICAL

S.No.	Title	CO Mapping
1.	Write a Love/Breakup Letter relating to any product covering its positive & negative features, strength, and fix, enhance and rethink.	CO1
2.	Write the Design Thinking Steps i.e. Empathize, Define the problem, Ideate, Prototype and Test relating to the product you choose.	CO1
3.	Understand a real-world problem and try solving it through an Empathy Map	CO1
4.	Write a persona of any celebrity or personal	CO1
5.	Understand the way advertisement makes use of storytelling. Pick a particular advertisement and make a presentation on it, covering - character, plot, conflict, climax, resolution	CO2
6.	Develop a collage using four/five pictures, do storyboarding based on the collage.	CO2
7.	Develop a low-level prototype like Paper Prototype	CO2
8.	Find a problem statement and perform testing on it using certain testing technique.	CO2

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
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BTCS102M	BEC	Introduction to Design Thinking	Max	60	20	20	30	20	2	0	2	3
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9.	Demonstrate a project using design thinking process.	CO3
10.	Demonstrate the tools and techniques used in design thinking	CO3

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	2	1	-	-	2	-	-	-	-	-	2	1	1	-
CO2	-	3	2	3	1	3	2	2	2	2	-	2	2	2	-
CO3	2	3	3	-	-	2	-	-	3	2	1	2	2	2	-
CO4	2	2	3	3	2	-	-	-	3	3	2	2	3	2	1

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (CSE-Generative AI-IBM) (in association with IBM)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIBM109N	DCC	Fundamental of AI & ML	Max	60	20	20	30	20	3	1	2	1
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Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To develop foundational understanding of core AI concepts, including machine learning, neural networks, deep learning, and Generative AI models such as large language models (LLMs).
2. To explore key AI application domains, such as natural language processing, computer vision, robotics, and industry-specific use cases, highlighting AI's role in driving innovation.
3. To enable learners to understand ethical, social, and governance considerations in AI development and deployment, and gain practical exposure through hands-on labs and projects.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education).**

COURSE OUTCOMES:

After completion of the course, the student will be able to:

CO1 Explain fundamental AI techniques, including ML, deep learning, NLP, and Generative AI models

CO2 Apply AI tools and methods to real-world problems by performing hands-on experiments, analyzing datasets, and implementing basic AI solutions across different domains.

CO3 Evaluate the impact of AI on businesses and society, demonstrating awareness of ethical issues, responsible AI practices, and governance frameworks.

CO4 Analyze the role of Artificial Intelligence in business transformation, automation, intelligent systems, and emerging technologies such as AI agents, cloud computing, and robotics

CO5 Evaluate ethical, legal, governance, and societal issues associated with Artificial Intelligence and demonstrate responsible and ethical use of AI technologies.

TEACHING PEDAGOGY:

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1 Quiz

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ATL2 Activity Based Learning
ATL3 Midterm Exams
ATL4 Flip Class
ATL5 Seminar Presentation
ATL6 Assignments
ATL7 Poster
ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Skills, Basic Programming Concepts, Data Handling Concepts, Spreadsheet Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Introduction and Applications of AI** Introducing AI, Artificial Intelligence vs. Augmented Intelligence, Introducing Generative AI and Its Use Cases, Reading: Different types of AI, The Evolution of AI: Traditional AI vs. Generative AI, Artificial Intelligence - Are We There Yet?, AI in Daily Life, AI Chatbots and Smart Assistants, What Is a Chatbot?, AI Assistant-User Conversations, Applications of AI in Different Industries, Generative AI Tools and Applications, Ten Everyday AI and Machine Learning Use Cases, Generative AI Tools in Action	6	ATL2 ATL3 ATL4 ATL8
II	**AI Concepts, Terminology, and Application Domains** Cognitive Computing, Terminologies and Related Concepts of AI, Machine Learning, Machine Learning: Techniques and Training, Deep Learning, Neural Networks, Machine Learning vs. Deep Learning, • Video: Generative AI Models, Large Language Model, AI Integration in Everyday Life, Machine Learning vs. Deep Learning vs. Foundation Models, Natural Language Processing, Speech, and Computer Vision, What Is NLP (Natural Language Processing)?, Self-Driving Cars, AI and Cloud Computing, Edge	8	ATL2 ATL3 ATL4 ATL8

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	Computing, and IoT		
III	**AI Agents** What Are AI Agents?, Robotics and Automation, Transforming Businesses Through AI, The Rise of Generative AI for Business, Generative AI for Business Transformation, Become a Value Creator with Generative AI, Introduction to RAG, What Is Retrieval-Augmented Generation (RAG)?, Adopting AI in Your Business, • Video: Frameworks for AI Adoption, AI Adoption Frameworks: Amazon, OpenAI, and Facebook, Transforming Your Work Through AI Tools, Career Opportunities with AI, Using Generative AI for Your Work, Humans vs. AI: Who Should Make the Decision?	8	ATL2 ATL3 ATL4 ATL8
IV	**Issues, Concerns, and Ethical Considerations** Ethical Considerations and Responsible Use of AI, Considerations Around Generative AI, Why Large Language Models Hallucinate, Perspective of Key Players Around AI Ethics, The Importance of AI Governance, Responsible Use of AI at Work, How to implement AI Ethics	6	ATL2 ATL6
V	**Introduction to Machine Learning for Everyone** Machine Learning Model Life-cycle, A Day in the life of a Machine Learning Engineer, Tools for Machine Learning, Supervised vs Unsupervised Learning, Classification, Regression, Evaluating Machine Learning Models, Hands-on Lab: Machine Learning in Python	6	ATL2 ATL3 ATL4 ATL8
	Total Hours	**34**	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.ibm.com/think/topics/artificial-intelligence

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

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1. S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed. Hoboken, NJ, USA: Pearson, 2021.
2. A. Géron, *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*, 3rd ed. Sebastopol, CA, USA: O'Reilly Media, 2022.

REFERENCE BOOKS:

1. E. Alpaydin, *Introduction to Machine Learning*, 4th ed. Cambridge, MA, USA: MIT Press, 2020.
2. I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*. Cambridge, MA, USA: MIT Press, 2016.

LIST OF PRACTICAL

S.No.	Title	CO Mapping
1.	Study and demonstration of AI applications in healthcare, finance, education, agriculture, and smart cities	CO1
2.	Installation and familiarization with Python, Jupyter Notebook, Google Colab, and AI development libraries (NumPy, Pandas, Matplotlib, Scikit-learn)	CO2
3.	Data preprocessing and exploratory data analysis (EDA) using real-world datasets	CO2
4.	Implementation of Supervised Machine Learning algorithms (Linear Regression and Decision Tree Classification)	CO2, CO3
5.	Implementation of Unsupervised Machine Learning algorithms (K-Means Clustering)	CO2, CO3
6.	Build a basic Neural Network using TensorFlow/Keras for image or digit classification	CO1, CO3
7.	Text preprocessing and Sentiment Analysis using Natural Language Processing (NLP)	CO1, CO3
8.	Hands-on use of Generative AI tools (e.g., ChatGPT, Gemini, Microsoft Copilot) for content generation and prompt engineering	CO1, CO3
9.	Develop an AI-powered chatbot using Large Language Models (LLMs) or no-code AI platforms	CO3, CO4
10.	Case study on AI applications in Business Transformation, Robotics, Cloud AI, and	CO4

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	Intelligent Automation	
11	Comparative study of AI Agents, Cloud AI Services, and AI-powered Automation platforms	CO4
12	Mini Project: Develop an AI solution for a real-world problem and prepare an ethical impact assessment report	CO3, CO4, CO5

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

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CO3	-	2	-	-	2	3	2	3	-	2	1	2	1	2	2
CO4	2	3	2	1	3	2	2	-	1	2	2	2	2	3	1
CO5	-	1	-	-	1	3	3	3	2	2	-	2	-	2	3